

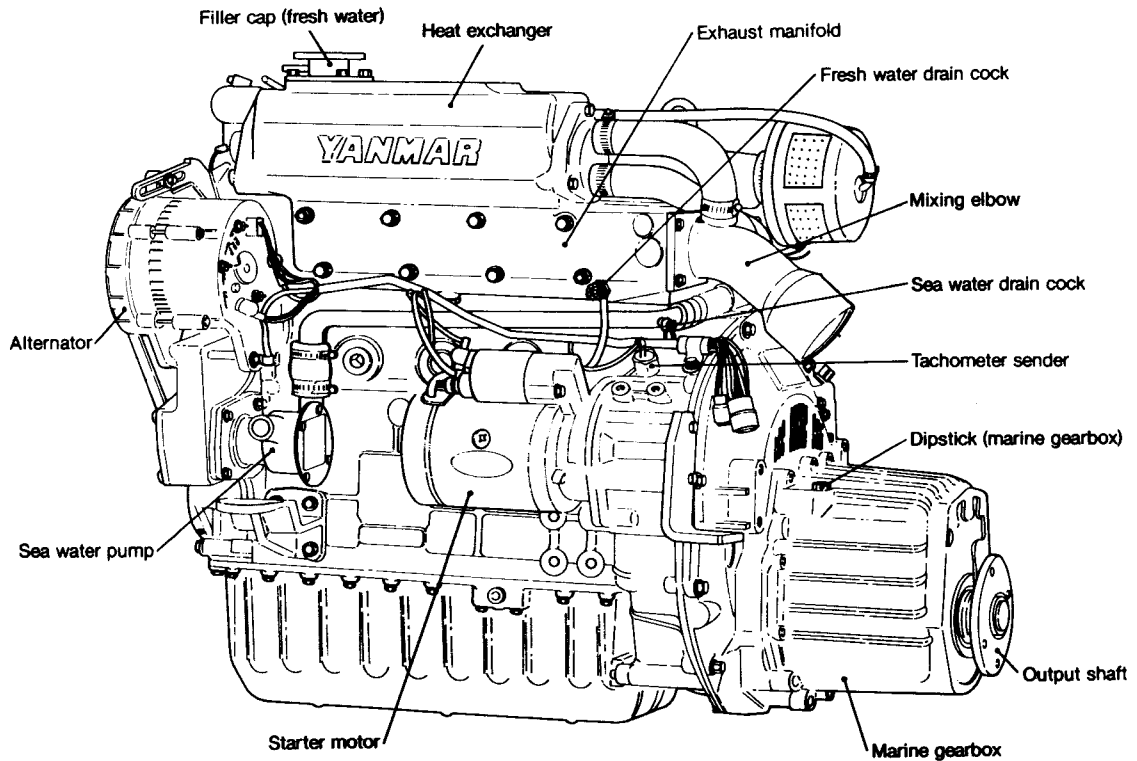
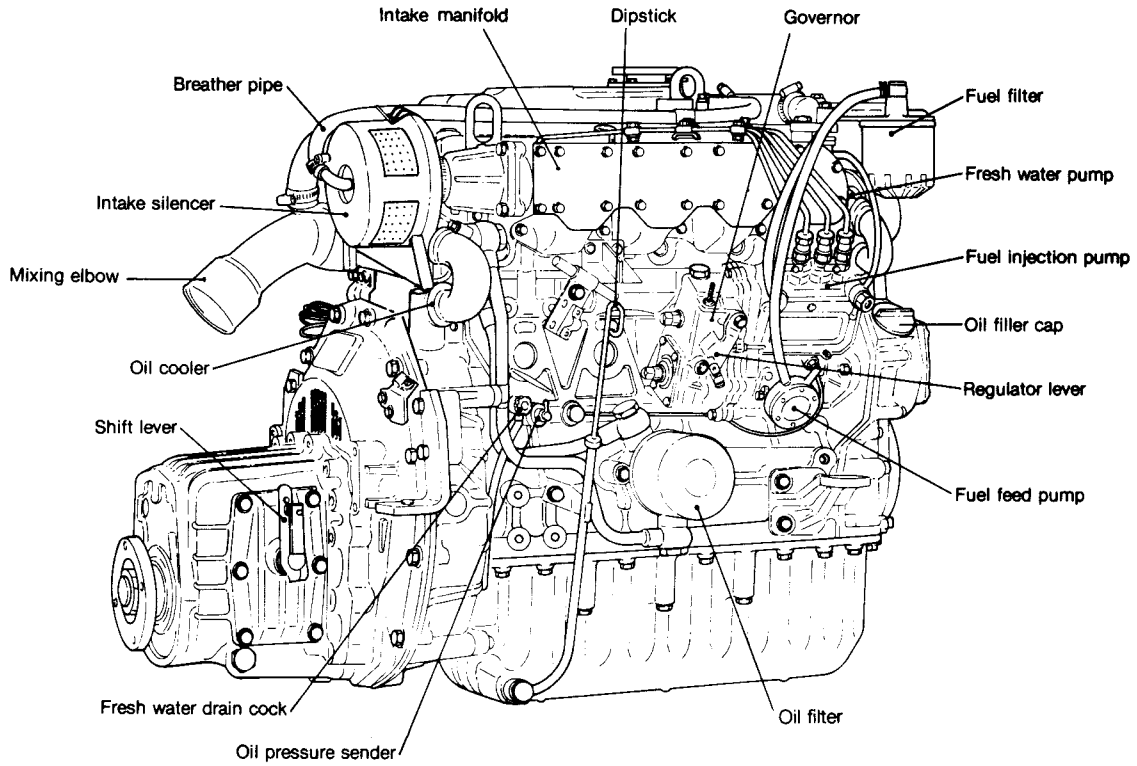
CHAPTER 1

GENERAL

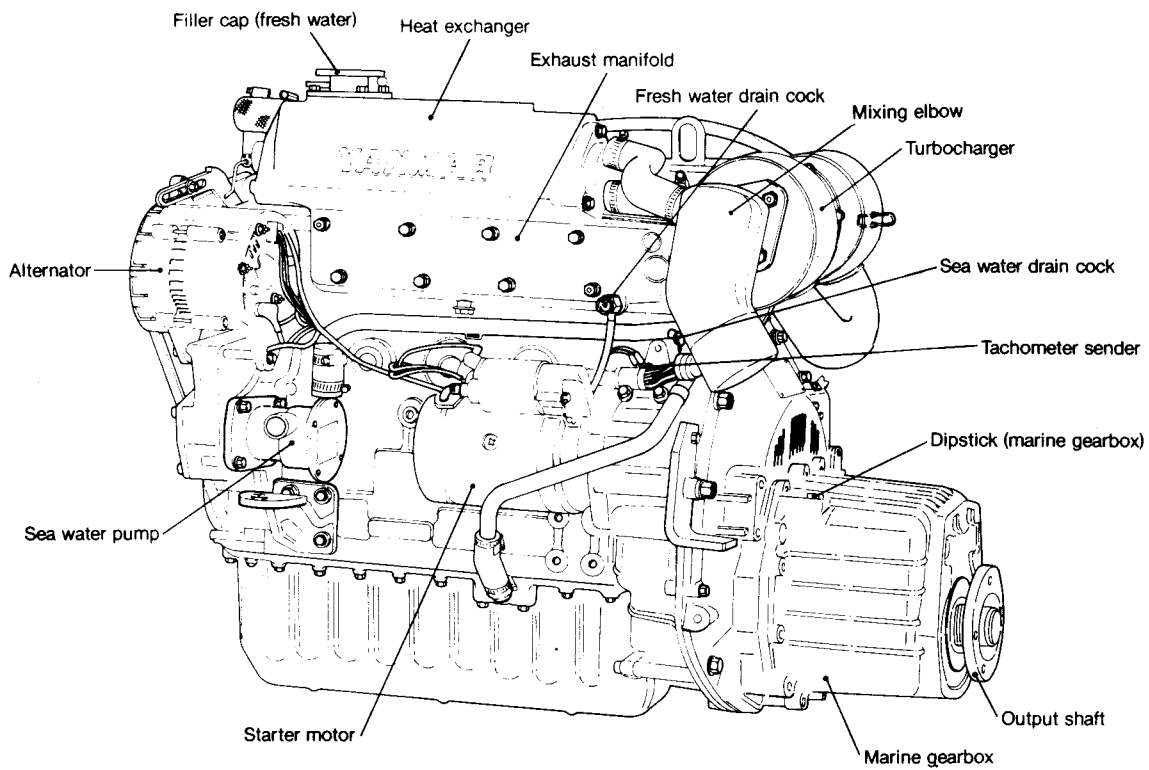
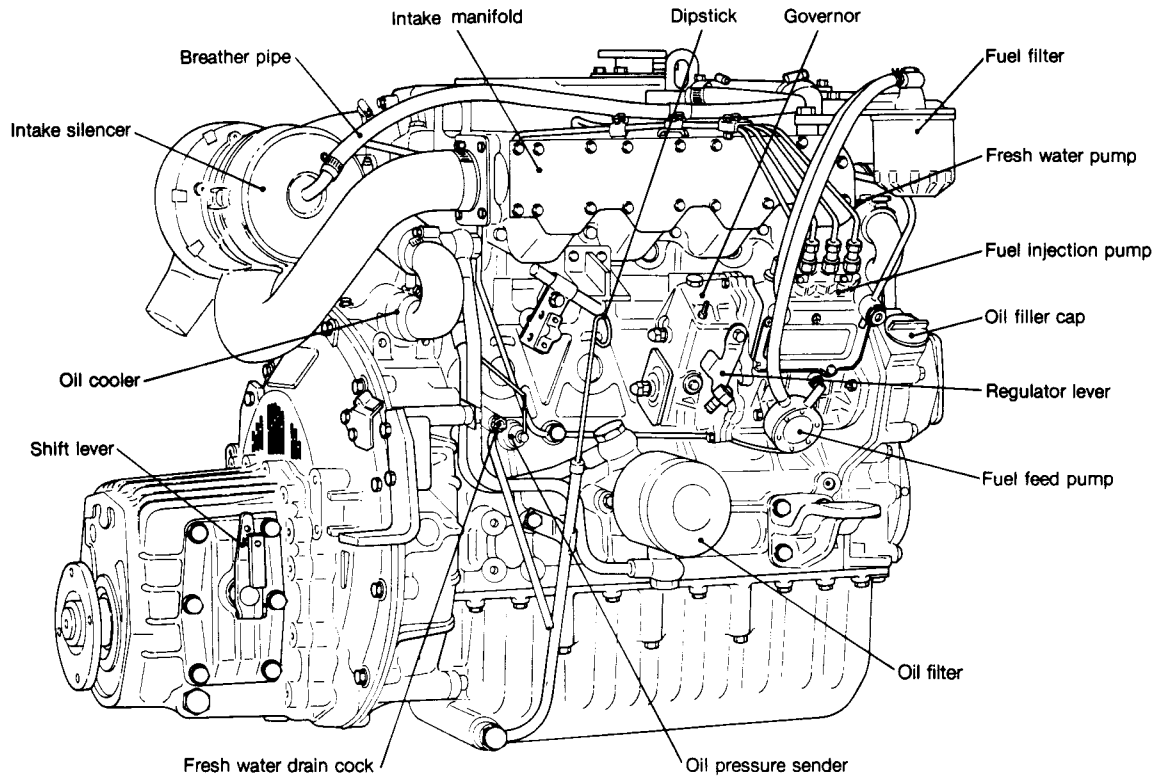
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1. Exterior Views

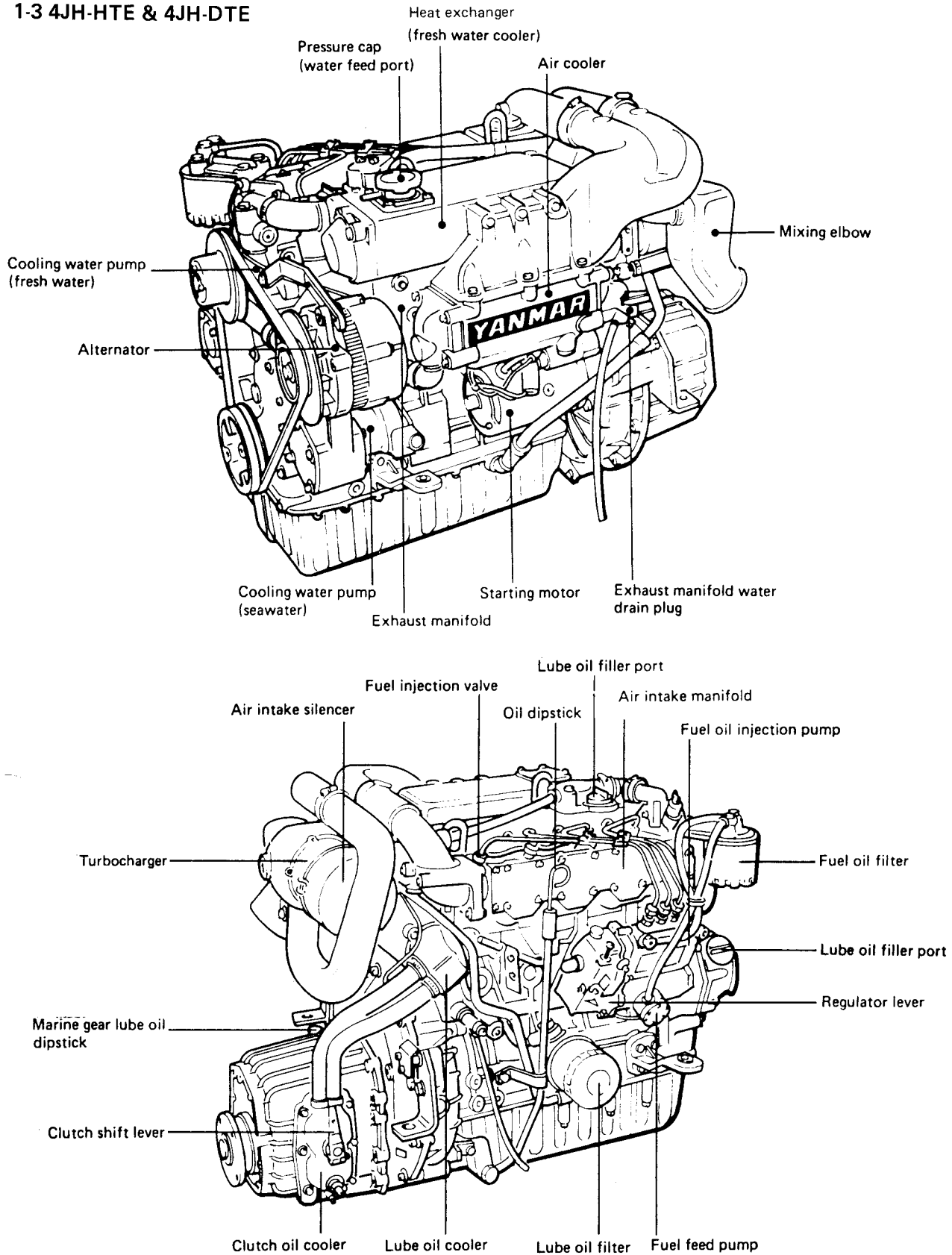
1-1 4JHE



1-2 4JH-TE



1-3 4JH-HTE & 4JH-DTE



2. Specifications

Model		4JHE	4JH-TE	4JH-HTE	4JH-DTE	
Type		Vertical 4-cycle water cooled diesel engine				
Combustion system		Direct injection				
Aspiration		Normal aspiration	Exhaust gas turbine turbocharger	Exhaust gas turbine turbocharger with intercooler		
Number of cylinders		4				
Bore x stroke		mm (in.) 78 x 86 (3.07 x 3.39)				
Displacement		ℓ (cu.in.) 1.644 (100.33)				
One hour rating output (DIN6270B)	Output/crankshaft speed	HP/rpm (kW/rpm)	44/3600 (32.4/3600)	55/3600 (40.5/3600)	66/3600 (48.6/3600)	77/3600 (56.7/3600)
	Brake mean effective pressure	Kg/cm ² (lb./in. ²)	6.69 (95.15)	8.36 (118.91)	10.0 (142.20)	11.7 (166.37)
	Piston speed	m/sec. (ft./sec.)	10.3 (33.79)	10.3 (33.79)	10.3 (33.79)	10.3 (33.79)
Continuous rating output (DIN6270A)	Output/crankshaft speed	HP/rpm (kW/rpm)	40/3500 (29.5/3500)	50/3500 (36.8/3500)	60/3500 (44.2/3500)	70/3500 (51.5/3500)
	Brake mean effective pressure	kg/cm ² (lb./in. ²)	6.26 (89.04)	7.82 (111.23)	9.39 (133.53)	11.0 (156.42)
	Piston speed	m/sec. (ft./sec.)	10.0 (32.81)	10.0 (32.81)	10.0 (32.81)	10.0 (32.81)
Compression ratio		17.8	16.2	15.9	15.9	
Fire order		180° 180° 180° 180° 1 - 3 - 4 - 2 - 1				
Fuel injection pump		Bosch in-line type YPES-CL				
Fuel injection timing (FID)		degree	12° ± 1° (*9° ± 1°) bTDC	12° ± 1° bTDC	12° ± 1° bTDC	12° ± 1° bTDC
Fuel injection pressure		kg/cm ² (lb./in. ²)	200 ± 5 (2844 ± 71)			
Fuel injection nozzles		Hole type				
Direction of rotation	Crankshaft	Counter-clockwise viewed from stern				
	Propeller shaft (Forward)	Clockwise viewed from stern				
Power take off		At flywheel side				
Cooling system		Constant high temperature fresh water cooling Fresh water: Centrifugal pump Sea water: Rubber impeller pump				
Lubrication system		Forced lubrication with trochoid pump				
Starting system	Starting motor	DC 12V, 1.8kW				
	AC generator	12V, 55A				
Turbocharger	Type		RHB52 (IHI)	RHB52HW (IHI)		
	Model		MY29	MY31	MY34	
	Cooling system		Air cooling	Water cooling		
Air cooler system	Type		Sea-water cooled Plate fin type	Sea-water cooled, Corrugated fin type		
	Radiation area	m ² (in. ²)		0.76 (1178)	0.67 (1038)	
Clutch	Model		KBW20	KBW21	KBW21	
	Type		Constant mesh gear with multiple friction disc clutch			
	Reduction ratio (Forward/Reverse)		2.17/3.06, 2.62/3.06, 3.28/3.06		2.17/3.06, 2.62/3.06	
	Propeller speed DIN6270A rating (Forward/Reverse)		1615/1145, 1336/1145, 1068/1145		1615/1145, 1336/1145	
	Lubricating oil capacity Effect/max	ℓ (cu.in.)	0.15/1.2 (9.15/73.22)			
	Clutch weight	kg (lb.)	26 (57.33)	30 (66.15)	30 (66.15)	
Dimensions	Overall length	mm (in.)	906.3 (35.68)	906.3 (35.68)	906.3 (35.68)	
	Overall width	mm (in.)	561 (22.09)	561 (22.09)	561 (22.09)	
	Overall height	mm (in.)	659 (25.94)	668 (26.30)	668 (26.30)	
Engine weight with clutch (dry)		kg (lb.)	226 (498)	232 (511)	246 (542)	246 (542)
Lubricating oil capacity Effect/max.		ℓ (cu.in.)	3.0/6.5 (183.06/396.63)			
Cooling water capacity (Fresh water)	Fresh water tank	ℓ (cu.in.)	6.0 (366.12)			
	Sub tank	ℓ (cu.in.)	0.8 (48.82)			

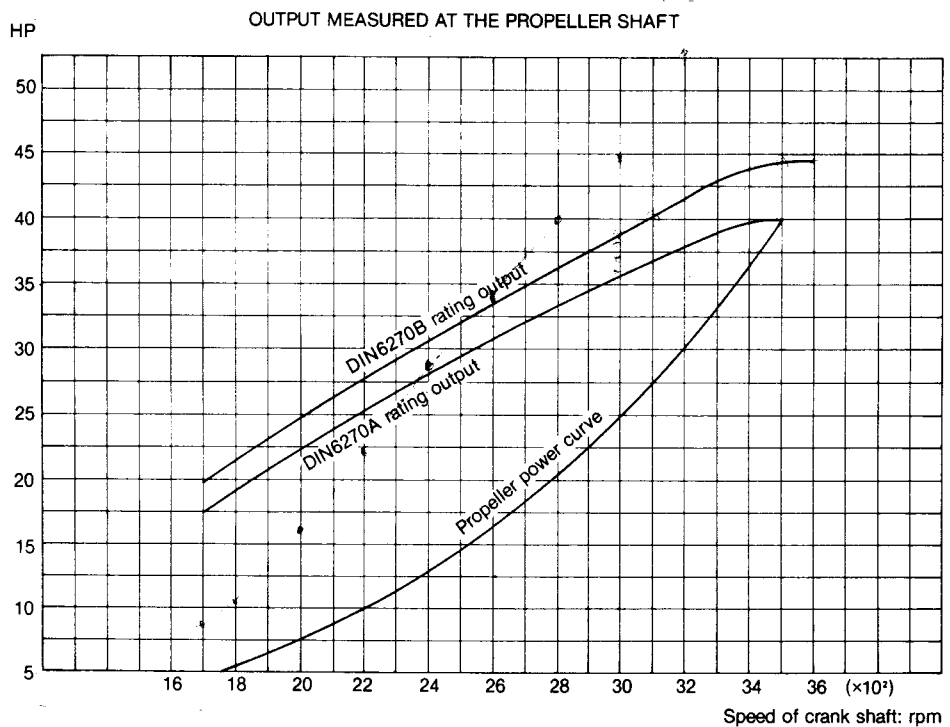
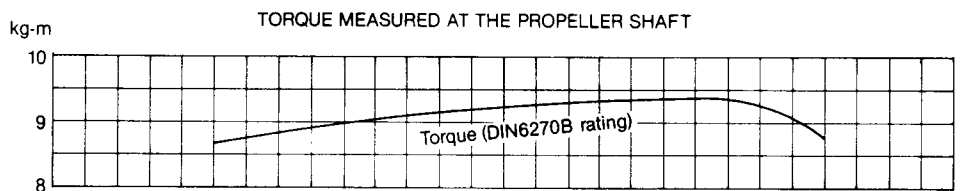
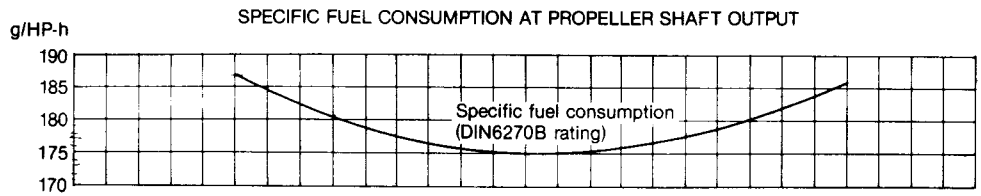
Note: *Applicable engine number #/E 00101 ~ 00574

3. Construction

ENGINE MODEL		4JH	4JH-TE	4JH-HTE	4JH-DTE
Group	Part	Construction			
Engine Proper	Cylinder block	Integrally-cast water jacket and crankcase			
	Cylinder liner	Dry sleeve			
	Timing gear case	Cast aluminum			
	Oil sump	Cast aluminum, oil pan			
	Main bearings	Hanger-type bearings supports			
	Engine feet	Cylinder block and Flywheel mounting side			
Intake/Exhaust, Valve Drive	Cylinder head	Integrally-cast type, jet cooling between valves, Intake/exhaust valve seat inserts			
	Intake/exhaust valves	Mushroom shaped, seat angle: Intake: 120° Exhaust: 90°			
	Intake manifold	Aluminum diecast integral			
	Exhaust manifold	Water cooled integral with water tank			
	Air cooler			Plate fin type	Corrugated fin type
	Turbocharger	—	IHI RHB52 exhaust gas turbo	IHI RHB52HW exhaust gas turbo, Water cooled type.	
	Valve drive	Overhead valve push rod rocker arm system			
	Timing gear	Helical gear			
Main Moving Parts	Crankshaft	Stamped forging			
	Flywheel	Cast iron static balance with ring gear			
	Pistons	Cast aluminum, oval type			
	Piston rings	2 compression rings, 1 oil ring			
	Piston pin	Floating type			
	Connecting rod	Forged steel			
	Crank pin bushings	Aluminum bushings			
Lube Oil System	Lube oil pump	Trochoid type			
	Oil filter	Full flow paper element cartridge type			
	Oil cooler	Sea water cooled pipe type	Sea water cooled multi-pipe type		
	Control valve	Cylindrical type with external adjusting shims			
Cooling Water System	Fresh water pump	V-pulley driven, centrifugal type			
	Sea water pump	Gear driven, rubber impeller type			
	Thermostat	Wax pellet type			
	Fresh water cooler	Multi-tube type integral with exhaust manifold			
Bilge	Bilge pump	Electric			
Fuel Injection Equipment	Fuel injection pump	YANMAR YPES-CL type integral with governor			
	Fuel injection nozzles	Hole type			
	Fuel feed pump	Diaphragm type			
	Fuel filter	Paper element cartridge type			
Governor	Governor	Centrifugal all-speed mechanical type			
Remote Control Equipment	Engine speed & marine gearbox	Single control lever type with push-pull cable			
Starting Equipment	Electric starter	DC 12V, 1.8kW starter motor			
	Generator	12V, 55A with built-in IC regulator			
Marine Gearbox	Clutch	Multi-disc mechanical wet type			
	Reduction gear	Helical gear constant mesh type			

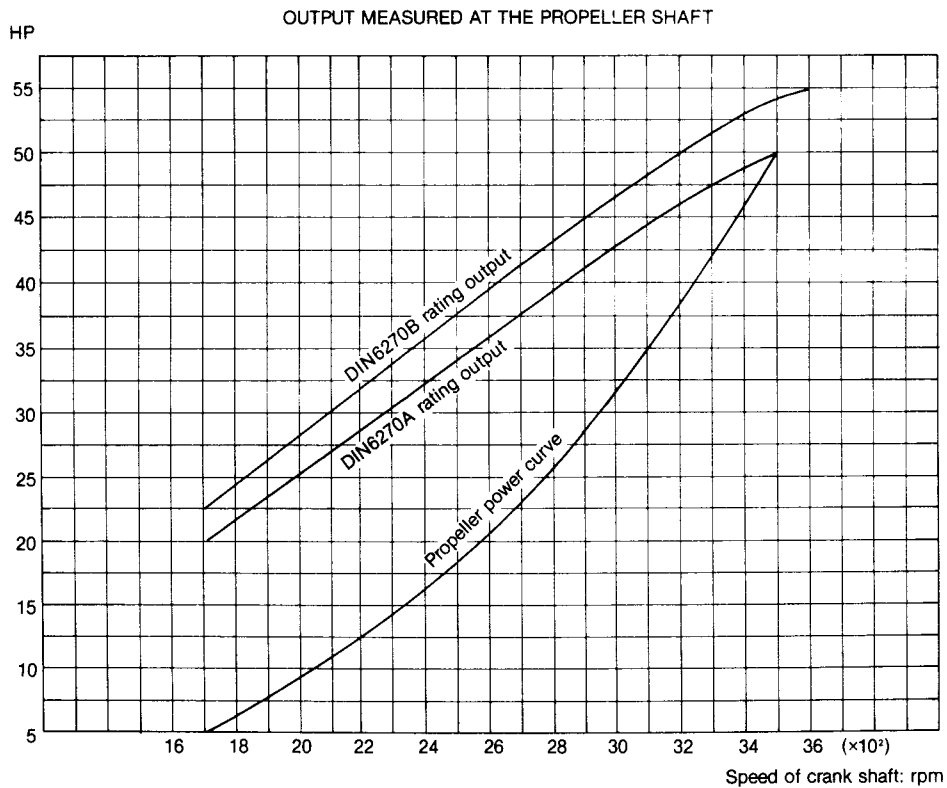
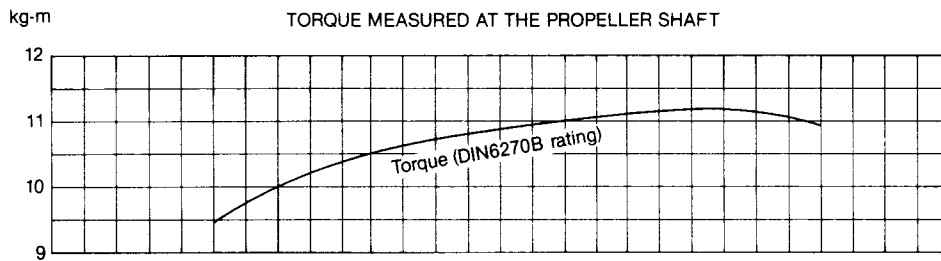
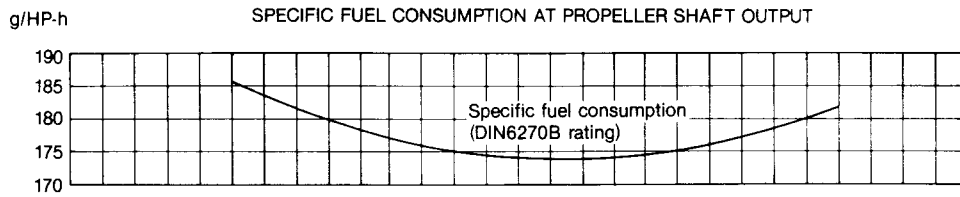
4. Performance Curves

4-1 4JHE



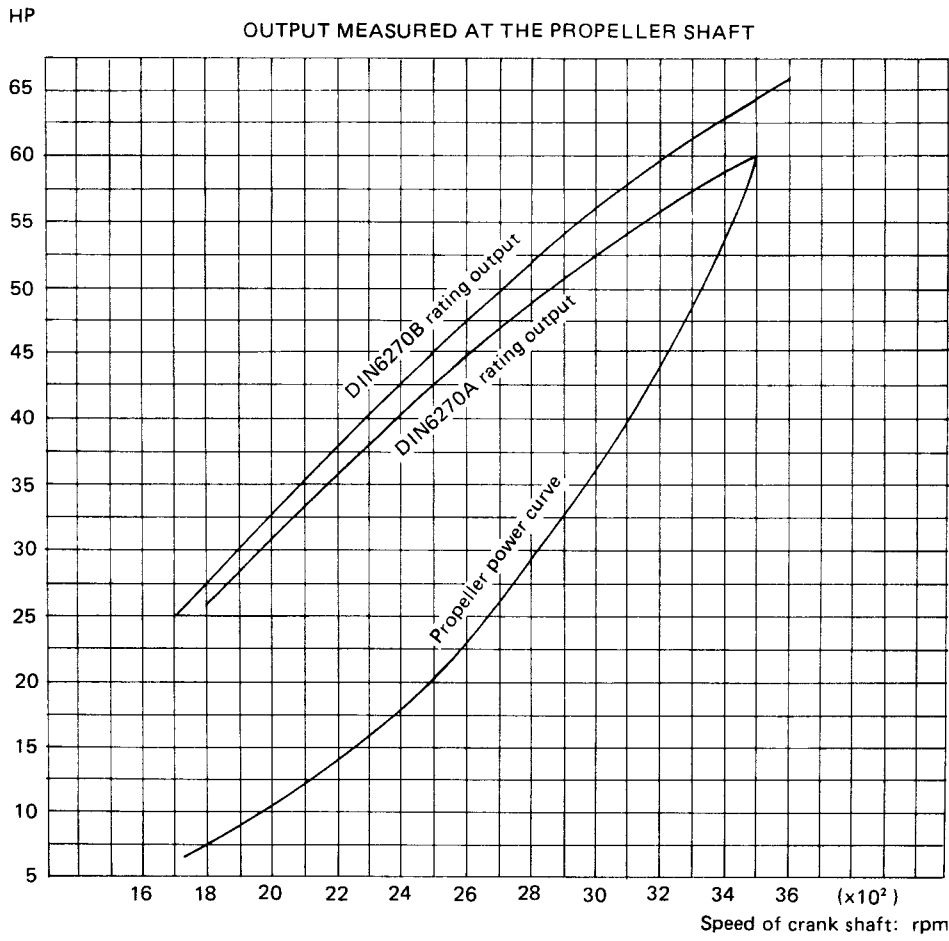
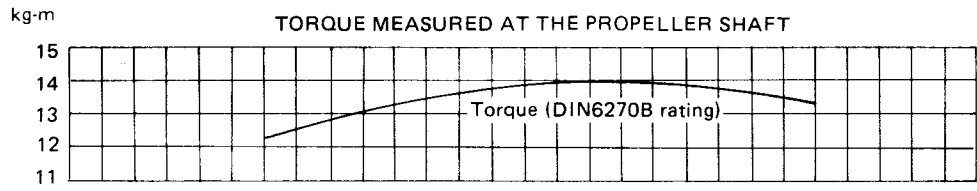
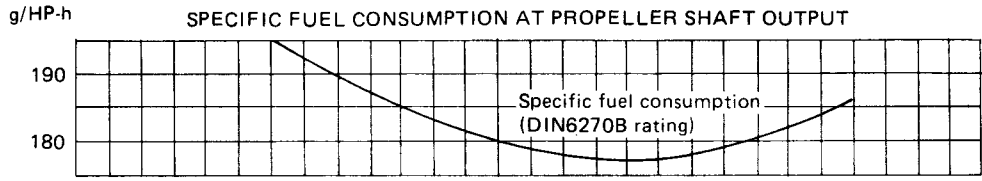
THE ENGINE FLYWHEEL OUTPUT IS APPROX. 3% HIGHER

4-2 4JH-TE



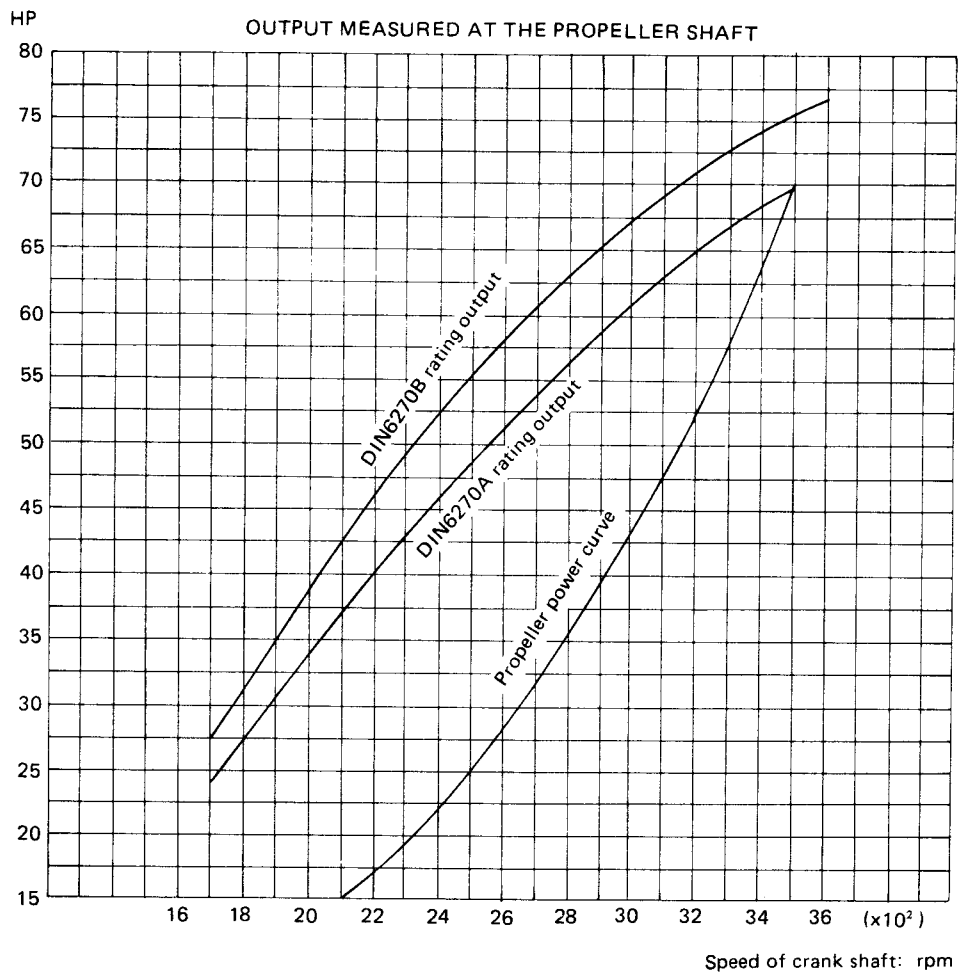
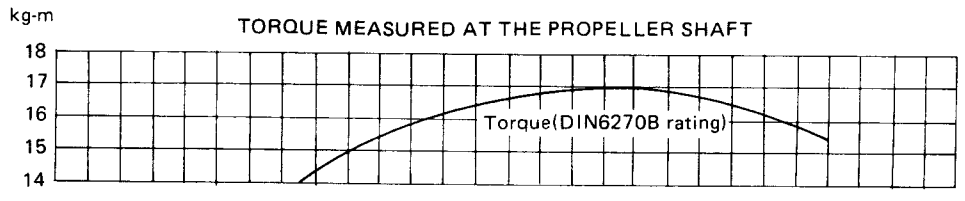
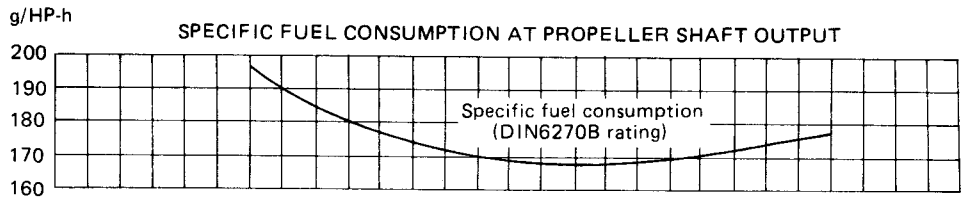
THE ENGINE FLYWHEEL OUTPUT IS APPROX. 3% HIGHER

4-3 4JH-HTE



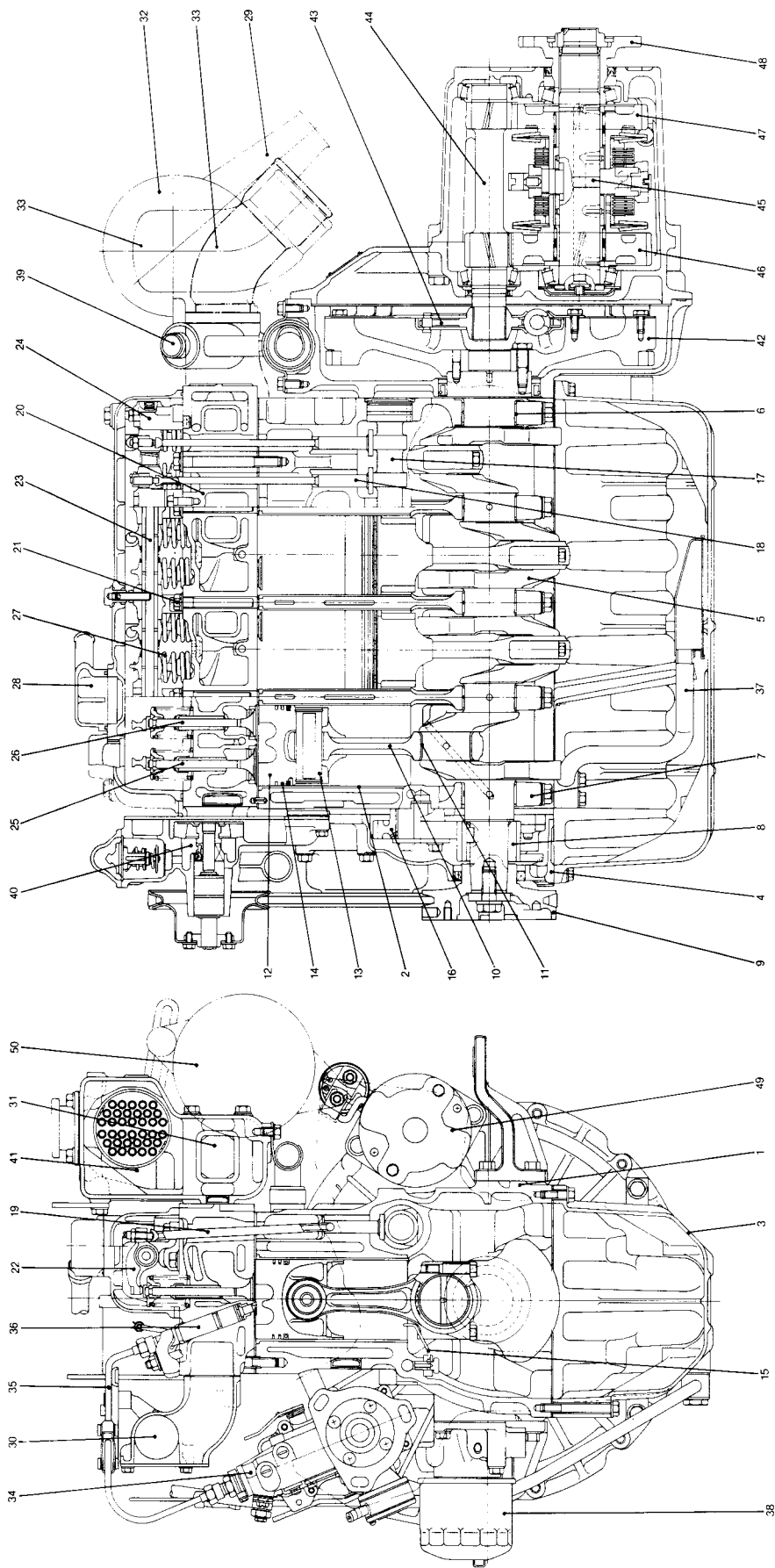
THE ENGINE FLYWHEEL OUTPUT IS APPROX, 3% HIGHER.

4-4 4JH-DTE



THE ENGINE FLYWHEEL OUTPUT IS APPROX, 3% HIGHER.

5. Engine Cross Section

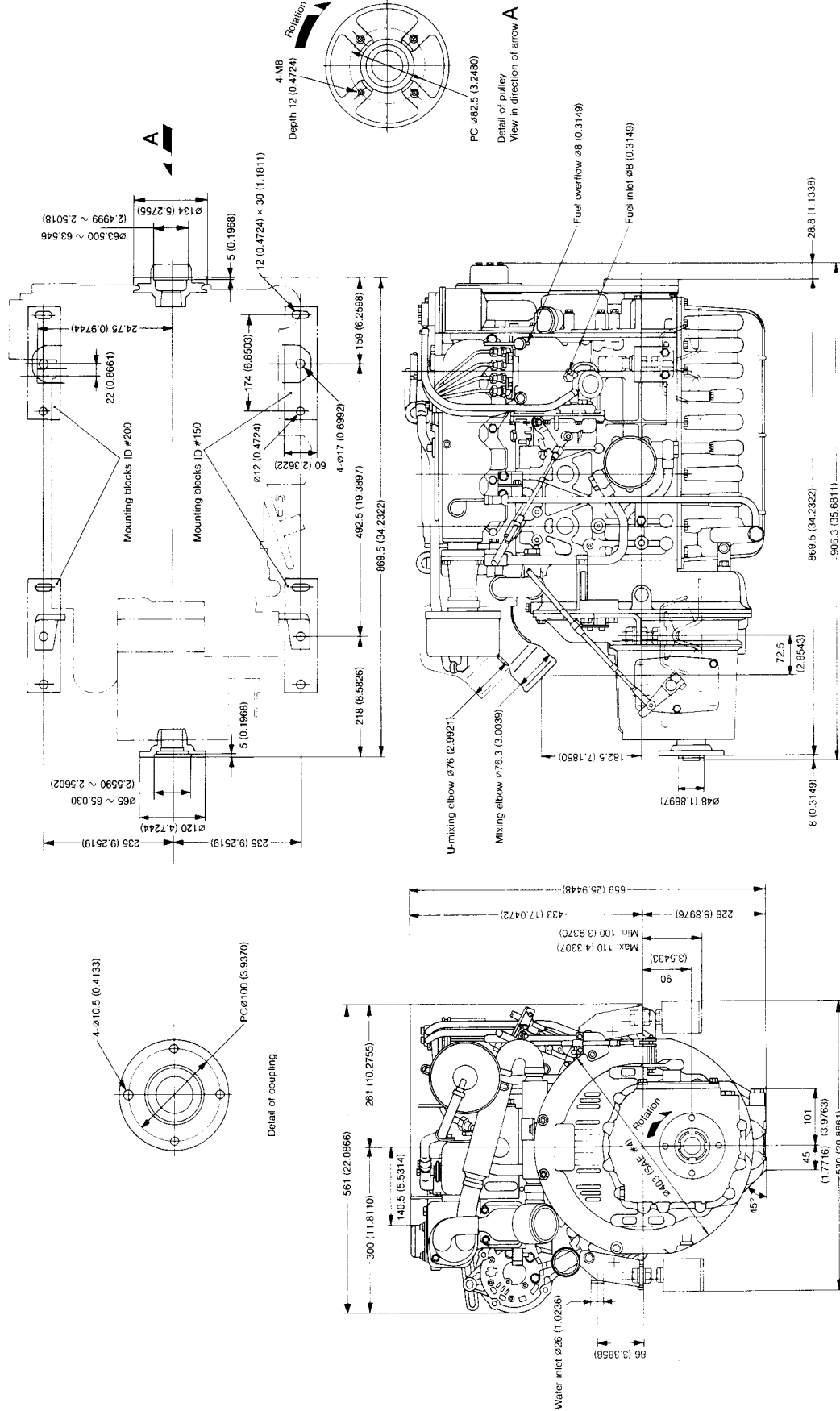


- 1. Cylinder block
- 2. Cylinder liner
- 3. Oil pan
- 4. Timing gear case
- 5. Crankshaft
- 6. Main bearing bushing
- 7. Bearing cap
- 8. Crank gear
- 9. Crankshaft V pulley
- 10. Connecting rod
- 11. Crank pin bushing
- 12. Piston pin
- 13. Piston pin
- 14. Piston ring
- 15. Piston cooling nozzle
- 16. Idle gear
- 17. Crankshaft
- 18. Piston
- 19. Push rod
- 20. Cylinder head
- 21. Cylinder head bolt
- 22. Valve rocker arm
- 23. Valve rocker arm shaft
- 24. Valve rocker arm shaft support
- 25. Intake valve
- 26. Exhaust valve
- 27. Valve spring
- 28. Brake silencer
- 29. Intake manifold
- 30. Intake manifold
- 31. Exhaust manifold
- 32. Turbocharger
- 33. Mixing elbow
- 34. Fuel injection pump
- 35. Fuel pressure pipe
- 36. Fuel injection nozzle
- 37. Fuel injection nozzle
- 38. Lubricating oil pipe
- 39. Lubricating oil filter
- 40. Cooling water pump
- 41. Heat exchanger
- 42. Flywheel
- 43. Damper disc
- 44. Input shaft
- 45. Output shaft
- 46. Forward gear
- 47. Reverse gear
- 48. Reverse gear coupling
- 49. Starting motor
- 50. Alternator

6. Dimensions

6-1 4JHE

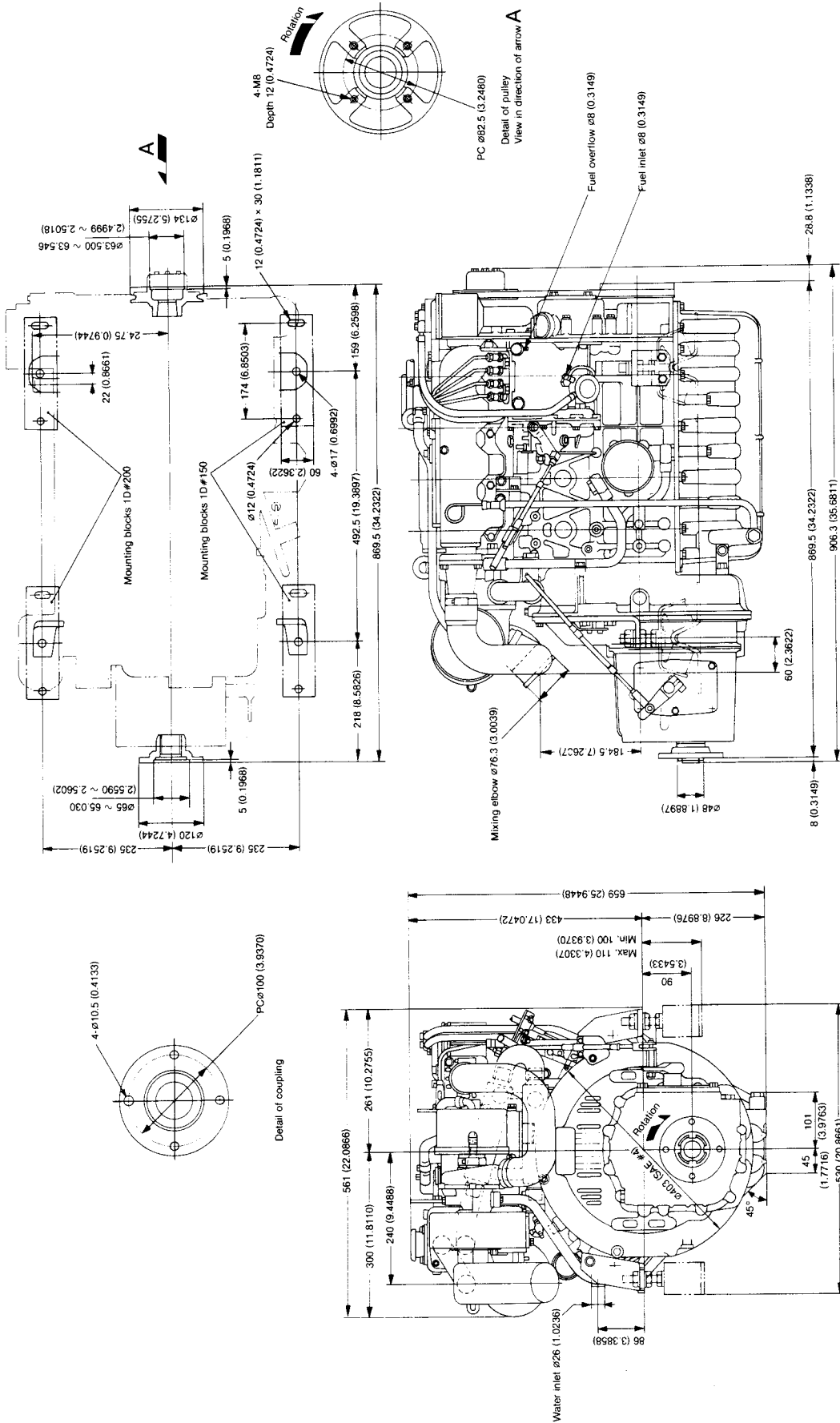
mm (in.)



Note: Dwg. shows mounting blocks at original height.
Engine weight will compress blocks by 4mm (approx.).

6-2 4JH-TE

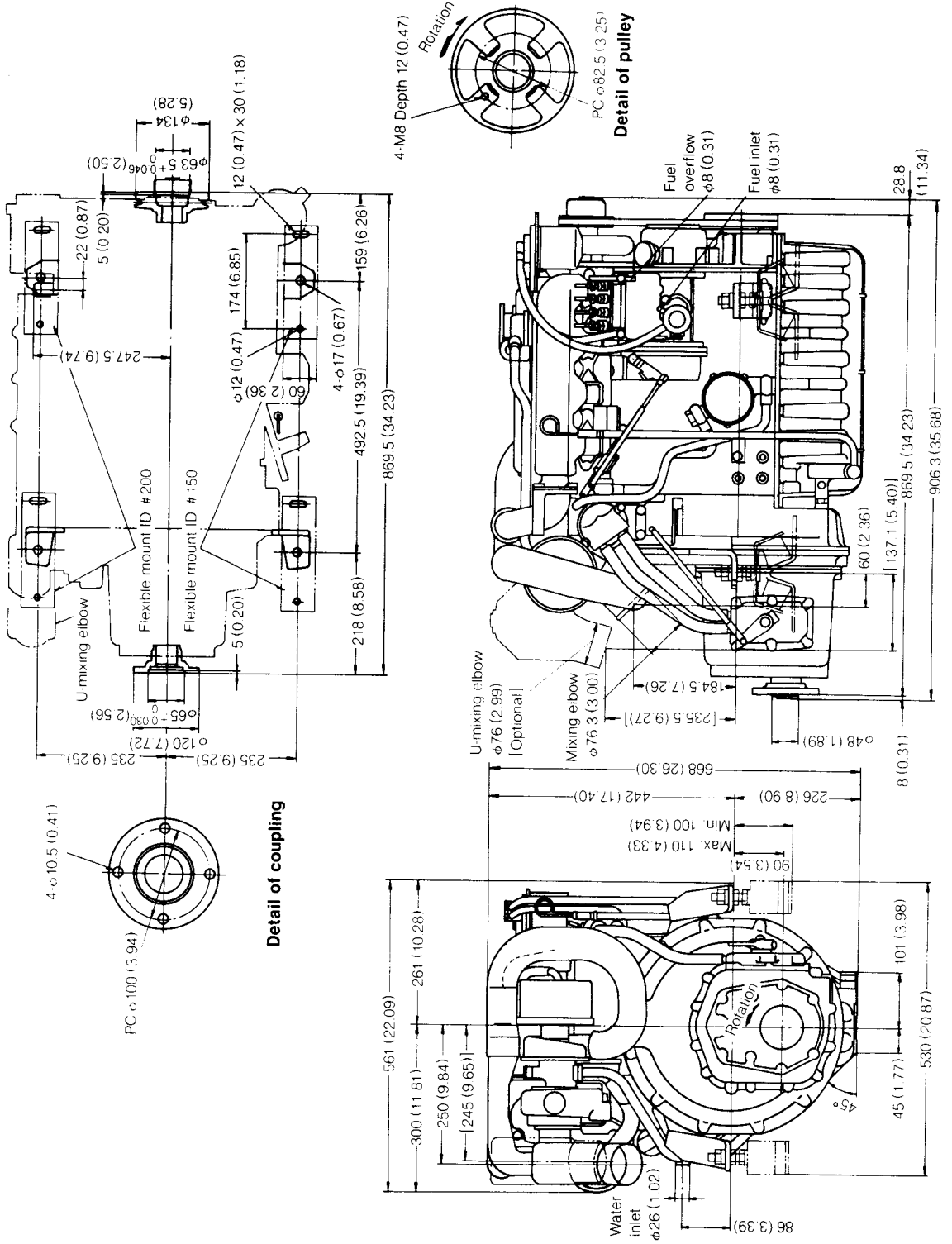
mm (in.)



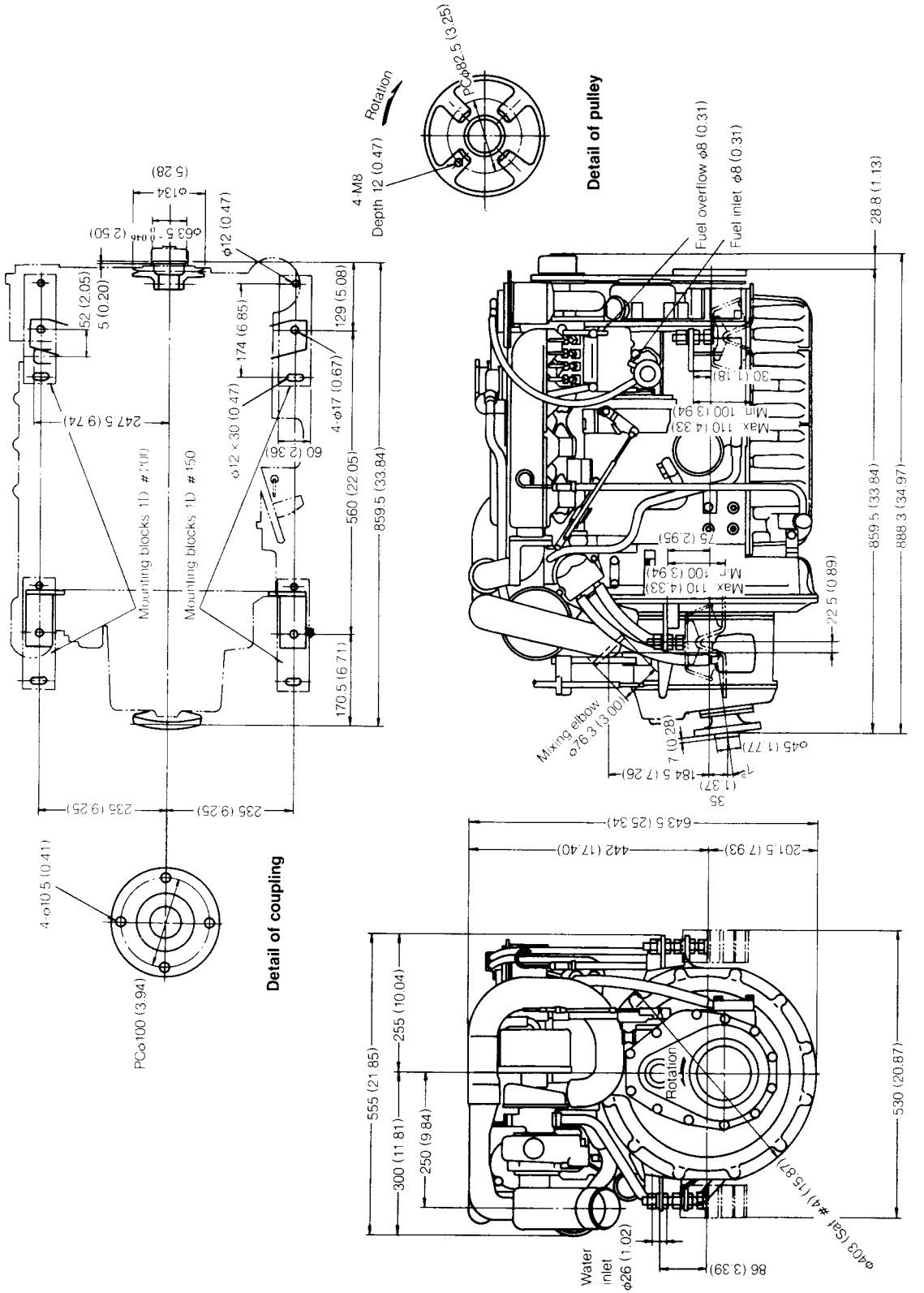
Note: Dwg. shows mounting blocks at original height.
Engine weight will compress blocks by 4mm (approx.).

6-3 4JH-HTE

4JH Series

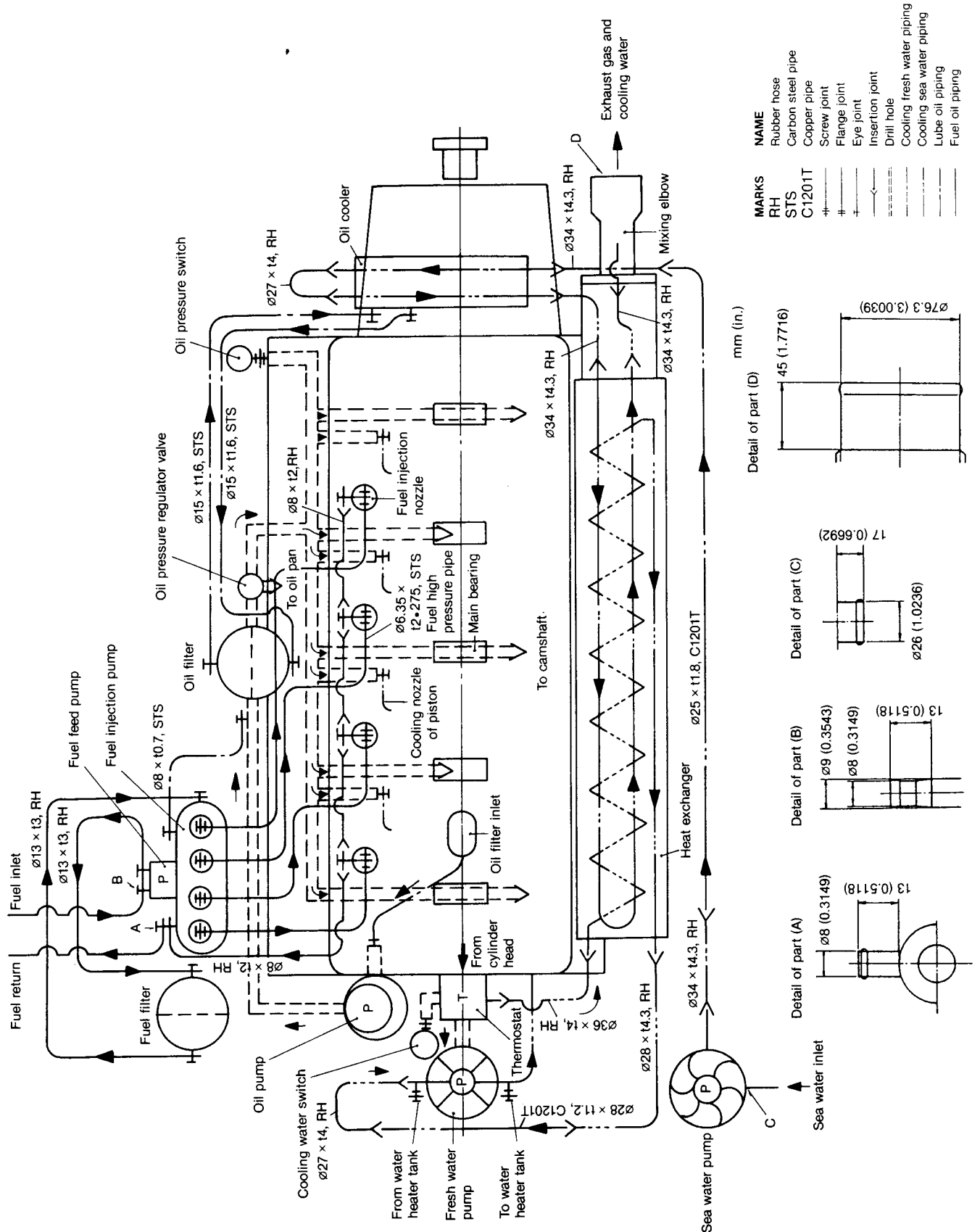


6-4 4JH-DTE

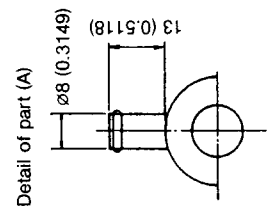
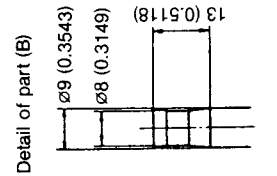
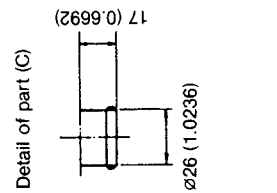
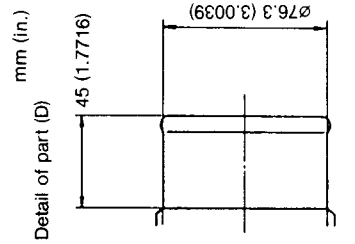


7. Piping Diagrams

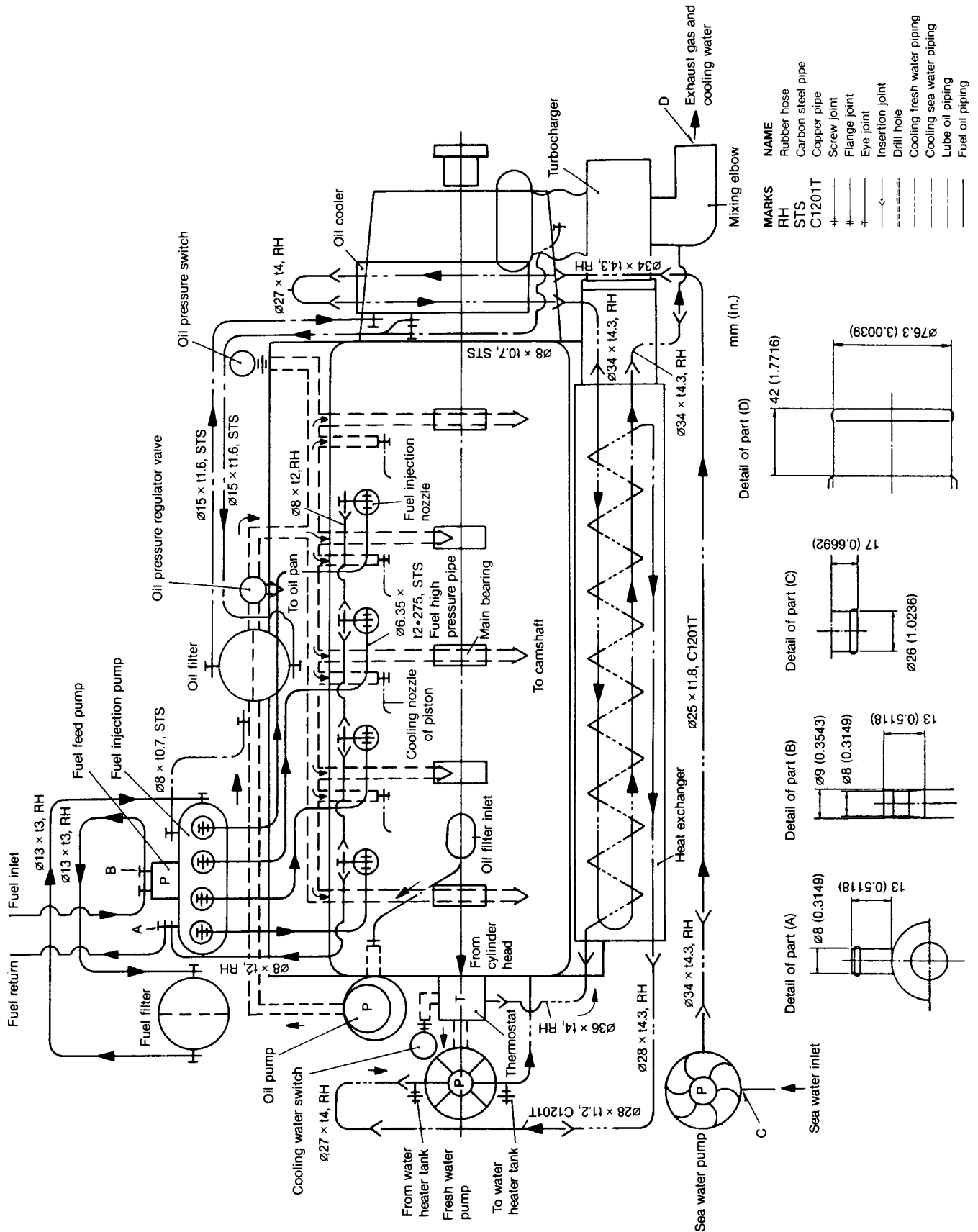
7-1 4JHE



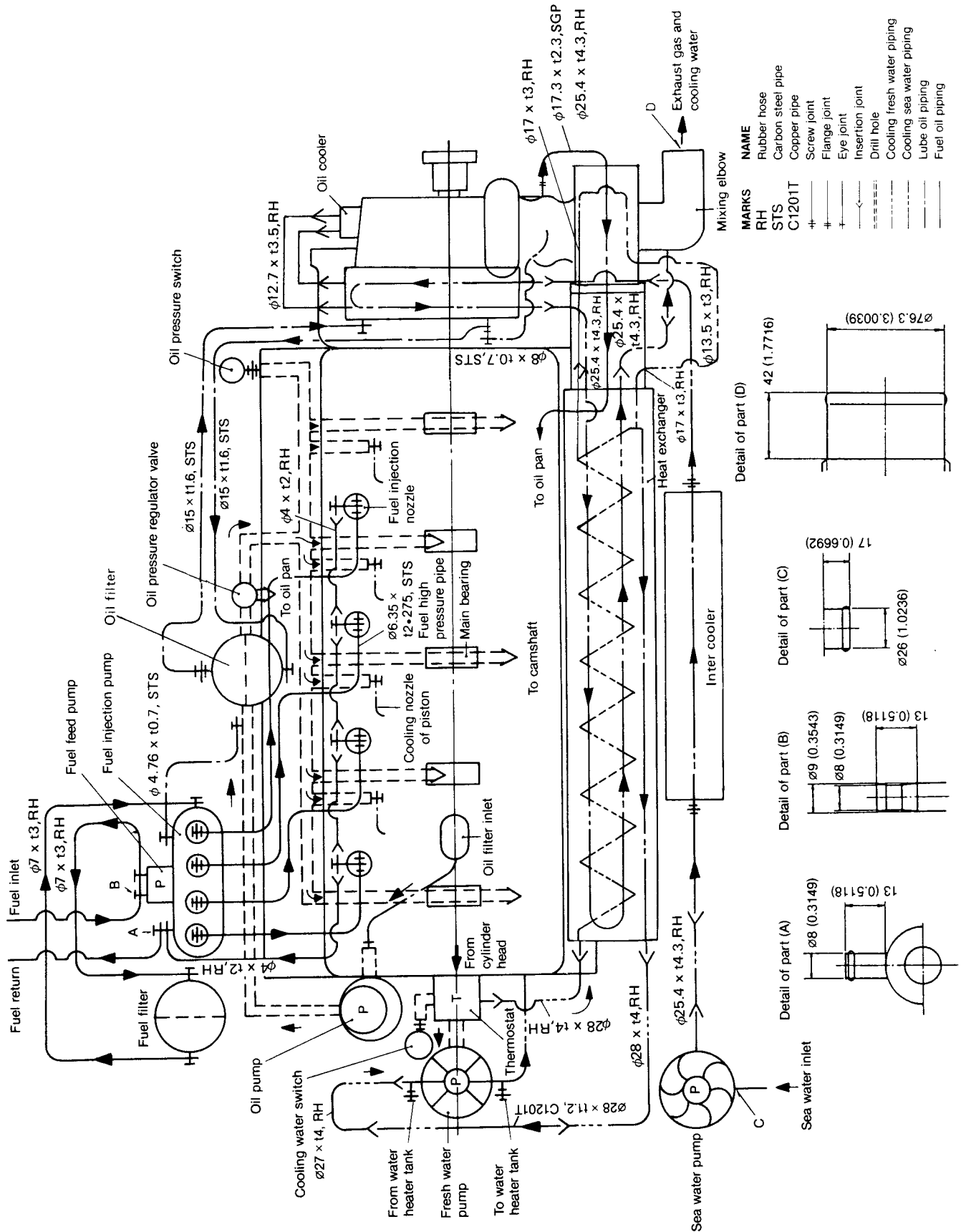
MARKS	NAME
RH	Rubber hose
STS	Carbon steel pipe
C1201T	Copper pipe
+	Screw joint
#	Flange joint
+	Eye joint
—	Insertion joint
—	Drill hole
—	Cooling fresh water piping
—	Cooling sea water piping
—	Lube oil piping
—	Fuel oil piping



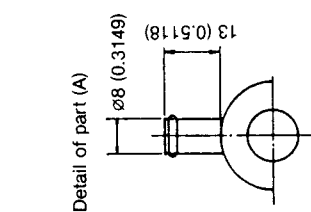
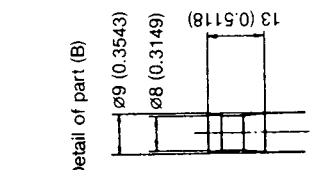
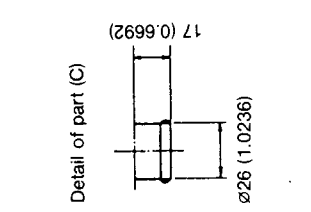
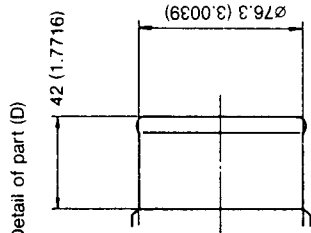
7-2 4JH-TE



7-3 4JH-HTE & 4JH-DT(B)E



MARKS	NAME
RH	Rubber hose
STS	Carbon steel pipe
C1201T	Copper pipe
+	Screw joint
+	Flange joint
+	Eye joint
+	Insertion joint
---	Drill hole
---	Cooling fresh water piping
---	Cooling sea water piping
---	Lube oil piping
---	Fuel oil piping




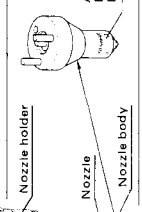
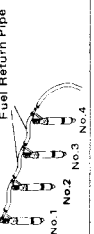
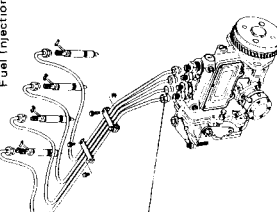


8. Parts Interchangeability

4JH-Series Parts Interchangeability (Cylinder Head Assembly, Piston and FIE)

IMPORTANT:

There is no interchangeability between the old type and the new type parts.
To ensure the parts interchangeability among the 4JH series engines, be sure to change all the relative parts as follows.

CHANGE PARTS		ENGINE MODEL	4JHE	4JH-TE	4JH-HTE	4JH-DTE	Note.
1) Cylinder Head Ass'y	Old type	Part code: Swirl radio: Identification mark: 729470-11700 2,25 1	729470-11700	□	729474-11700 2,0 5	□	Cylinder Head 
	New type	Part code: Swirl radio: Identification mark: 729470-11701 2,8 SL	729470-11701	729474-11701 2,0 5G	□	□	
2) Piston	Old type	Part code: Identification mark: 129400-22020	129400-22020	129472-22010 2	129474-22010 5	□	Piston 
	New type	Part code: Identification mark: 129400-22021 A	129400-22021	129472-22011 B	129474-22010 C (only changed I.D. mark)	□	
3) - 1 Automatic Timer Assy (Automatic Advancing Timer)	Old type	Part code: Advanced angle: Cam. deg. Identification mark: 729470-54101 5,5 JH-A1	729470-54101	729472-54100 3,5 JH-B0	729499-54100 2,5 JH-C0	□	Automatic Timer 
	New type	Part code: Advanced angle: Cam. deg. Identification mark: 729100-54100 4 TN-A0	729100-54100	729499-54100 2,5 JH-C0	□	□	
3) - 2 Fuel Injection Nozzle Ass'y	Old type	Part code: Identification mark: Nozzle identification mark: 729470-53101 E 155P244J1	729470-53101	729472-53100 B 150P284J0	729499-53100 D 145P265J1	□	Nozzle holder Nozzle Nozzle body 
	New type	Part code: Identification mark: Nozzle identification mark: 129470-53102 F 155P244J2	129470-53102	729499-53102 G 140P255J2	□	□	
3) - 3 Fuel Return Pipe	Old type	Part code: Length: 121250-59550 90mm	129470-59550	□	□	□	Fuel Return Pipe 
	New type	Part code: Length: 121250-59550 120mm	121250-59550	□	□	□	
3) - 4 Fuel Injection Pipe (Pump to Nozzle)	Old type	Part code: (No. 1, Cylinder) (No. 2, Cylinder) (No. 3, Cylinder) (No. 4, Cylinder) Size: Inner dia, Length, Identification mark: 129470-59810 129470-59820 129470-59830 129470-59840 φ1,8 400mm None	129470-59810	□	129499-59810 129499-59820 129499-59830 129499-59840 φ2,0 400mm None	□	Fuel Injection Pipe 
	New type	Part code: (No. 1, Cylinder) (No. 2, Cylinder) (No. 3, Cylinder) (No. 4, Cylinder) Size: Inner dia, Length, Identification mark: 129470-59811 129470-59821 129470-59831 129470-59841 φ1,8 400mm 18	129470-59811	□	129499-59811 129499-59821 129499-59831 129499-59841 φ2,0 400mm 20	□	

Applicable Engine Model and Engine Number: 4JHE, E/#1001 and after (Jun., 21'85 YANMAR Plant)
4JH-TE, E/#11001 and after (Jun., 21'85 YANMAR Plant)
4JH-HTE, E/#21001 and after (Jun., 21'85 YANMAR Plant)
4JH-DTE, E/#30101 and after (Jun., 21'85 YANMAR Plant)